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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,091	06/30/2003	Robert J. Steger	015290-682	8130

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EXAMINER

DHINGRA, RAKESH KUMAR

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 02/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/608,091

Applicant(s)

STEGER, ROBERT J.

Examiner

James A. Fiorito

Art Unit

1763

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 13, 14 and 24-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 15-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/06/2006.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4,6,7-9,11,12,15-16,18-20, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura (US 6,676,805).

With respect to Claim 1: Tamura discloses a substrate support useful in a reaction chamber of a plasma processing apparatus (Fig. 9), the substrate support comprising: a ceramic member (Fig. 9 Item 40); a metallic heat transfer member overlying the ceramic member (Fig. 9 Item 2), the heat transfer member including at least one flow passage through which a liquid can be circulated to heat and/or cool the heat transfer member (Fig. 9 Item 42); and an electrostatic chuck overlying the heat transfer member (Fig. 9 Item 18), the electrostatic chuck having a support surface for supporting a substrate in a reaction chamber of a plasma processing apparatus (Fig. 9 Item 1).

With respect to Claim 2: Tamura discloses a heat transfer member (Fig. 9 Item 2).

With respect to Claim 3: Tamura discloses a substrate support in accordance with claim 1.

With respect to Claim 4: Tamura discloses a substrate support further comprising a source of temperature controlled liquid in flow communication with the at least one flow passage (Fig. 9 Item 43).

With respect to Claim 6: Tamura discloses a heat transfer gas source operable to supply a heat transfer gas between the support surface and the substrate (Fig. 9 Item 21), and a controller operable to (i) control the volumetric flow rate and/or the temperature of the liquid circulated through the at least one flow passage (Fig. 9 Item 43), and/or (ii) to control the flow rate and/or pressure of the heat transfer gas supplied between the support surface and the substrate.

With respect to Claim 7: Tamura discloses the heat transfer member comprises a base including the at least one flow passage (Fig. 9 Item 42) and a cover overlying the base (Column 6 Lines 12-17).

With respect to Claim 9: Tamura discloses a substrate support further comprising a ceramic ring (Column 15 Lines 20-23) overlying the ceramic member and surrounding the heat transfer member and the electrostatic chuck, the heat transfer member being laterally spaced from the ceramic ring, the electrostatic chuck contacting the ceramic ring (Fig. 9 Item 36).

With respect to Claim 11: Tamura discloses a substrate support further comprising an elastomeric joint between the ceramic member and the heat transfer member, and an elastomeric joint between the heat transfer member and the electrostatic chuck (Column 18 Lines 44-48).

With respect to Claim 12: Tamura discloses a plasma processing apparatus comprising the substrate support of Claim 1 (Fig. 1).

With respect to Claim 15: Tamura discloses A substrate support useful in a plasma processing apparatus, comprising, a source of temperature controlled liquid (Fig. 9 Item 43), a ceramic member (Fig. 9 Item 40), a metallic heat transfer member overlying the ceramic member (Fig. 9 Item 2), the heat transfer member including at least one flow passage in fluid communication with the liquid source and through which the liquid can be circulated to heat and/or cool the heat transfer member at a rate of from about 0.25-2°C/sec (Fig. 9 Item 2, Column 15 Lines 41-47); and an electrostatic chuck overlying the heat transfer member (Fig. 9 Item 18), the electrostatic chuck having a support surface for supporting a substrate in a reaction chamber of a plasma processing apparatus (Fig. 9 Item 1).

With respect to Claim 16: Tamura discloses a heat transfer member (Fig. 9 Item 2).

With respect to claim 18: Tamura discloses the heat transfer member comprises a base including at least one flow passage (Fig. 9 Item 42), and a cover overlying the base (Column 6 Lines 12-17).

With respect to Claim 20: Tamura discloses a substrate support of Claim 15, further comprising a ceramic ring (Column 15 Lines 20-23) overlying the ceramic member and surrounding the heat transfer member and the electrostatic chuck, the heat transfer member being laterally spaced from the ceramic ring, the electrostatic chuck contacting the ceramic ring (Fig. 9 Item 36).

With respect to Claim 22: Tamura discloses a substrate support further comprising an elastomeric joint between the ceramic member and the heat transfer member, and an elastomeric joint between the heat transfer member and the electrostatic chuck (Column 18 Lines 44-47).

With respect to Claim 23: Tamura discloses a plasma processing apparatus comprising the substrate support of Claim 15 (Fig. 1).

Tamura does not expressly disclose the heat transfer member having specific dimensions, or specific heat exchange rate.

At the time of invention it would have been obvious to one of ordinary skill in the art form the heat transfer member of Tamura with the thickness of 1/4 inch or 1/8 inch to provide a heat transfer member with a low thermal mass to quicken the change in temperature of the heat transfer member given the same liquid flow rate. The only difference between the prior art and the claims is a recitation of relative dimensions of the claimed device and the device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device is not patentably distinct from the prior art device. In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. Denied, 469 U.S. 830, 225 USPQ 232 (1984).

Also, at the time of invention it would have been obvious to a person of ordinary skill in the art to form the heat transfer member of Tamura with the liquid source through which the liquid can be circulated to heat and/or cool the heat transfer member at a rate of from about 0.25-2°C/sec. The specified rates of heat transfer 0.25-2°C/sec depends

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on the operating parameters of the system such as the liquid temperature of the fluid and not the design of the heat transfer member. Therefore, the specified rates of heat transfer 0.25-2°C/sec lacks criticality and it would have been obvious to one having ordinary skill in the art to have determined the optimum values of the relevant process parameters through routine experimentation in the absence of a showing of criticality. *In re Malagari*, 182 USPPQ 549 (CCPA 1974).

With respect to Claims 8 and 19: It would have been obvious to one of ordinary skill in the art at the time of invention to form the substrate support of Tamura in accordance with Claims 8 and 19, since the only difference between the prior art and the claims is a recitation of relative dimensions of the claimed device and the device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device is not patentably distinct from the prior art device. In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. Denied, 469 U.S. 830, 225 USPQ 232 (1984).

Claims 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura (US 6,676,805) in view of Kanno (US 6,373,681).

With respect to Claims 10 and 21: Tamura discloses a substrate support in accordance with Claims 10 and 21.

Tamura does not expressly disclose an RF power source electrically connected to the heat transfer member.

Kanno discloses an RF power source electrically connected to the heat transfer member (Fig. 1 Item 7). Tamura and Kanno are analogous art because they are from the same field of endeavor, namely plasma processing substrate supports.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to form Tamura's apparatus including an RF power source electrically connected to the heat transfer member in view of the teaching of Kanno. The suggestion or motivation for doing so would have been to supply power for generating a plasma. Therefore, it would have been obvious at the time of invention to combine Tamura with Kanno for the benefit of a heat transfer member that could also be connected to a power source to generate a plasma.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura (US 6,676,805) in view of Oda (US 6,474,986).

With respect to Claim 5: Tamura discloses a substrate support in accordance with Claim 4.

Tamura does not expressly disclose the source of temperature controlled liquid includes a Peltier cooler operable to change the temperature of the liquid to a selected temperature.

Oda discloses a substrate support wherein the source of temperature controlled liquid includes a Peltier cooler operable to change the temperature of the liquid to a selected temperature (Fig. 14 Item 106). Tamura and Kanno are analogous art because they are from the same field of endeavor, namely coating process substrate supports.

At the time of invention it would have been obvious to a person of ordinary skill in the art to form Tamura's apparatus including the source of temperature controlled liquid includes a Peltier cooler operable to change the temperature of the liquid to a selected temperature in view of the teaching of Oda. The suggestion or motivation for doing so would have been to cool the refrigerant in a cooling container to a predetermined temperature by a Peltier effect (Column 2 Lines 37-38). Therefore it would obvious to combine Tamura with Oda for the benefit of the source of temperature controlled liquid includes a Peltier cooler operable to change the temperature of the liquid to a selected temperature to obtain the invention specified in Claim 5.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura (US 6,676,805) in view of Yang (US 6,635,580).

With respect to Claim 17: Tamura discloses a substrate support in accordance with Claim 15, further comprising: a heat transfer gas source operable to supply a heat transfer gas between the support surface and the substrate; and a controller operable to control operation of the liquid source (Column 15 Lines 41-47).

Tamura does not expressly disclose a controller operable to control operation of the heat transfer gas source.

Yang discloses a controller operable to control operation of the heat transfer gas source (Fig. 3 Item 80). Tamura and Yang are analogous art because they are from the same field of endeavor, namely plasma chamber substrate holders.

At the time of invention it would have been obvious to a person of ordinary skill in the art to form Tamura's substrate holder including a controller operable to control

operation of the heat transfer gas source in view of the teaching by Yang. The suggestion or motivation for doing so would have been to control the temperature of the substrate. Therefore it would have been obvious to combine Tamura with Yang for the benefit of a controller operable to control operation of the heat transfer gas source to obtain the invention specified in Claim 17.

Response to Arguments

Applicant's arguments filed January 23, 2006 have been fully considered but they are not persuasive.

Applicants have submitted that Tamura provides no disclosure of dynamic, close temperature control nor does Tamura provide motivation for use of dynamic temperature control. However, even though Tamura provides no disclosure of dynamic, close temperature control nor does Tamura provide motivation for use of dynamic temperature control. The teachings of Tamura are sufficient to overcome the claimed material of the applicants.

In regard to the applicants' discussion of MPEP § 2143: The prima facie case of obviousness is established by the knowledge generally available to one of ordinary skill in the art.

The applicants have requested the citation of prior art supporting the condition that those skilled in the art would have been motivated to design a thin heat transfer member with a low thermal mass to quicken the change in temperature of the heat transfer member. Johnsgard (US 2002/0047004) teaches rapids thermal processing (RTP) using thin heating lamps with low thermal mass (Paragraph 5).

The applicants have also requested the citation of prior art supporting the condition that it would have been obvious to one skilled in the art to understand that the thin heat transfer member would have a faster change in temperature provided a smaller flow rate than the thick heat transfer member, if a broader range of inlet temperatures of the liquid were allowed. The textbook Fundamentals of Physics by Halliday (Equation 19-14) $Q = c m (T_f - T_i)$ teaches that heating rate Q is a function of specific heat, mass flow rate, and change in temperature. This equation shows that the rate of heat depends both on the flow rate and the temperature of the material. Therefore, one of ordinary skill in the art would understand that by decreasing the flow rate one could change the temperature of the material to provide an greater or equal rate of heat transfer.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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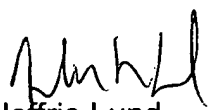
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Fiorito whose telephone number is (571)272-7426. The examiner can normally be reached on Standard.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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